

in the Pampas near Buenos-Ayres. M. Broca adds a brief description of the human bones.—M<sup>me</sup>. Royer, under the title "Le Système pileux," treats of the different character of hair in man and the lower animals, and the different line of direction presented in the two, which under all other variations remains constant and invariable. The author especially considers the questions how far the hairless condition of the human body may be due to sexual selection, and how far man's progressive mental development may have resulted from the necessity of counteracting the inconveniences due to the absence of this means of protection.—Dr. Beuzengue gives a report of the Arnold School for deaf-mutes at Moscow. The writer's object is to prove that *surdo-mutism* is, in the majority of cases, the immediate result of cerebral lesions, and not due to consanguinity of the parents. The limited number of cases (110) observed, and the short time in which the establishment has been in existence, render the classification in accordance with rank and nationality, of comparatively little value, but the indications of the condition of health, intelligence, &c., of the children, are interesting as bearing out the writer's views.—A paper by C. S. Wake on the beard, as characteristic of race, is translated.—M. Przyborski has published the result of his explorations in Volhynia, where he has discovered traces of pile dwellings, and obtained flint knives and animal remains.—M. Zawisza has continued his examination of the fauna of the caverns of Poland, and M. Ossowski, following the investigations of Przyborski, has explored burial mounds in Volhynia, belonging presumably to the latest prehistoric times, while M. Loski has brought to light a large number of cinerary urns from Terespol on the Bug.

THE *Archives des Sciences Physiques et Naturelles*, vol. iii., January 15.—On dichroite seiches, by M. F. A. Forel and M. J.-L. Soret.—Proceedings of The Chemical Society of Geneva.—On the constitution of the dibromic ethylene, by M. E. Demole.—On isophthalophenone or diphenieizophtalide, by M. E. Ador.—On metallotherapy, by M. M. Schiff.—On several applications of centrifugal force, by M. Thiery.

## SOCIETIES AND ACADEMIES

### LONDON

Linnean Society, February 19.—W. Carruthers, vice-president, in the chair.—Mr. J. Britten exhibited stems of *Myrmecodia echinata* and *M. glabra*, recently sent from Borneo by Mr. H. O. Forbes, showing the remarkable tunnelled galleries formed by a species of ant allied to, if not identical with, *Pheidole javana*, Mayr. Specimens of very young plants were also shown, all of which had been attacked by the ants. Beccari, who had studied *Myrmecodia* in its native localities, asserts that the presence of the ants is essential to the plant's existence, for unless the young plants are thus attacked by the ants, they soon perish.—Dr. Maxwell Masters also brought forward an example of a pitcher plant (*Nepenthes bicalcarata*) from Borneo, and he read a note thereon from Mr. Burbidge. It seems these pitchers are perfect traps to creeping insects, by reason of the incurved ridges round the throat of the pitcher. To get safely at the prisoners a certain species of black ant ingeniously perforates the stalk, and, tunneling upwards, thus provides an inroad and exit to the sumptuous fare of dead and decaying insects contained in the reservoir. The remarkable Lemuroid *Tarsius spectrum*, likewise visits the pitcher plants for the sake of the entrapped insects. These it can easily obtain from the *N. Rafflesiana*, but not so from *N. bicalcarata*, where the sharp spurs severely prick, if the animal dares to trifle with the urn lid.—Dr. J. E. T. Aitcheson next read a contribution on the flora of the Kurum Valley, Afghanistan. Of 15,000 specimens or 950 species collected, the material shows a meeting of floras, European, Persian, Afghanistan, Tibetan, and Himalayan in character. In the Kurum and Hariab valleys the Deodar, our finest Himalayan timber tree, forms dense forests, many of which will be found easily worked and hereafter valuable for exportation. The pine and the oak forests descend and recede much according to the nature of the hill range, its exposure, dryness, or moisture. The walnut and amlak (*Diospyros lotus*) produce excellent fruit. *Chamarops Ritchiana*, a branching palm, 20 feet high when uninjured, forms but an aloe-like scrub on the plateau west to the Darwaza Gar Pass. Of new species and varieties the genera *Acantholimon*, *Astragalus*, *Oxytropis*, *Cousinia*, *Nepeta*, *Sedum*, *Saxifraga*, *Pleurospermum*, *Cotyledon*, *Eremurus*, *Rosa*, *Rhododendron*, *Clematis*, and *Polygonum* yield noteworthy examples. Ferns were not plentiful, though over a dozen species were

found, and *Nephrodium rigidum*, most characteristic, now for the first time found Afghan. Most of the European edible fruits are found in the orchards. Tobacco is occasionally grown, but plants used in kitchen gardening are rarely cultivated. The climate of the Hariab district is much colder and dryer than Kurum, and the rigour of the winter, accordingly, reacts on the vegetation. Dr. Aitcheson, *en passant*, gave interesting information relative to the native uses of the plants, and also mentioned that nearly every house keeps bees, so that a large trade is done in barter for honey. On his approaching return to Afghanistan, Dr. Aitcheson hopes still further to work out the flora of the districts traversed by our army.—Mr. Edwin Simpson-Baikie was elected a Fellow of the Society.

Chemical Society, March 4.—Mr. Warren De la Rue, president, in the chair.—Prof. T. E. Thorpe delivered a lecture on the relation between the molecular weights of substances, and their specific gravities when in the liquid state. The lecturer gave the results of some elaborate investigations with which he had been engaged during the last four or five years. He gave a *résumé* of Kopp's conclusions on the above subject, and pointed out the interesting evidence which could thus be gained as to the atomicity of elements in various compounds. He has determined the specific volumes of fifty-two liquids, inorganic and organic, on the principle adopted by Kopp, *i.e.*, determining the specific gravity, the boiling-point, and rate of expansion. A description of the apparatus used in these determinations was given. He has in the main confirmed Kopp's results, and has arrived at the following conclusions:—1. A difference of  $\text{CH}_2$  in a homologous series corresponds to a difference of 22 in the specific volume. 2. Carbon has a specific volume of 11, hydrogen of 5.53. 3. There is no reason for accepting Buff's hypothesis that the specific volume is a function of the atomic value of an element. 4. The inference of Kopp that members of the same family have the same specific volume does not appear to be well founded. 5. The specific volume appears to be a periodic function of the atomic weight.

Geological Society, February 25.—Robert Etheridge, F.R.S., president, in the chair.—Joseph H. Cowham, William Alexander Forbes, M. H. Gray, and Charles Thomas Whitmell were elected Fellows of the Society.—The President announced that a communication had been received from the American Academy of Arts and Sciences, stating that the Academy proposed to celebrate its 100th anniversary on May 26, 1880, on which occasion the Academy hoped that one or more delegates from the Geological Society of London might be present.—The following communication was read:—On the geology of Anglesey, by Prof. T. McKenny Hughes, M.A. The author brought forward evidence to show that, resting on the central gneissic axis of Anglesey, there was a series of conglomerates which he referred to the base of the Cambrian; that the Lingula-flags had not yet been recognised; that the conglomerates were followed by the brown sandstones hitherto referred to Caradoc, but which he identified by the included fossils with Tremadoc; that the lower part of the black-shale group was arenig, as shown by the graptolites; while he thought that the higher parts of the black-shale group might turn out to be Lower Bala; that the black shales pass under the gnarled schists. He then adduced evidence to show that these gnarled schists were not foliated or in any way true metamorphic rocks, but only crumpled laminated beds in which all the alteration that had taken place was of the nature of vein-structure, and a kind of universal slickenside, consequent upon the crushing of a rock consisting of thin laminae of different texture; and suggested that the whole might be, like the green slates, &c., of Chapel-le-dale, in Yorkshire, the water-sorted outlying equivalents of volcanic rocks elsewhere, and be contemporaneous with the Snowdon volcanic series.—Notes on the strata exposed in laying out the Oxford Sewage Farm at Sandford-on-Thames, by E. S. Cobbold, F.G.S., Assoc.M. Inst. C.E. The beds noticed in this paper belong to the Kimmeridge clay and the upper and middle part of the Oxford oolite.—A review and description of the various species of British upper Silurian Fenestellidae, by G. W. Shrubsole, F.G.S.

Anthropological Institute, February 24.—Edward B. Tylor, F.R.S., president, in the chair.—The election of J. Hall Gladstone, Ph.D., F.R.S., as a new Member was announced.—Dr. Tylor read a paper on the origin of the plough and the wheeled carriage. The first agricultural implement seems to have been a pointed stick four or five feet long, such as many savage tribes still carry for the purpose of digging roots, knocking

down fruits, and unearthing animals; at a later date the stick was bent and used hoe-fashion, the point being hardened by fire; the Indians of North America still use it in this form. In south Sweden large tracts of land give evidence of early cultivation, which is attributed by the natives to a prehistoric people called by them "the hackers," whose rude hoe was a fir pole with a short projecting branch, pointed, and who are always associated with the giants of mythology. There came into use afterwards a larger instrument of the same kind, which was not used like the hoe, but dragged by men or oxen. Instances of this are to be found in old Egyptian pictures, and among the bas reliefs, and it is evidently the primitive idea of the plough. The plough is in its origin prehistoric, evidences of its early use being found amongst the Greeks, Egyptians, and Chinese, and it had from the earliest times a religious sanction, one proof of which is found in the fact that the name of Brahma's wife—Sita—signifies a furrow. A wooden hook shod with iron was the next improvement, and in the time of Virgil we find a wheeled plough in use, which differed little from the best in Europe a century ago. Some people assert that the plough was the earliest vehicle, but it seems more probable that the sled was first used, then rollers were placed underneath, and shifted forward when necessary, as seen in one of Raphael's pictures in the Vatican, and then the middle part of the rollers was shaved away in order to reduce friction. In some carts of the Scythians the solid drum wheel is fixed to the axle, so that wheel and axle revolve together; and in Italy and Portugal, at the present day, the carts are very generally built with large block drum wheels, and in many cases the bearings are not locked below, but merely rest on the axle like forks. The original mode of harnessing was the yoke, attached to the horns or withers of oxen; in the time of Homer no traces were used, but the Egyptians used one trace, which shows that they were one stage advanced in civilisation. The Gauls and Britons evidence a still further advance in the employment of chariots, some being even furnished with scythes, like those mentioned in the Maccabees.—Dr. Dally exhibited a fine collection of ethnological objects from British Columbia. On some of the hats which were shown, Dr. Dally pointed out marks similar to the tattoo marks with which the natives adorn their bodies, and which, he said, all have a definite meaning, being, in fact, a record of events which have taken place in the life of the wearer. Some of the specimens of native workmanship were remarkably good, particularly some silver bracelets which had been made and engraved specially for Dr. Dally. The natives appear to have a knowledge of working iron and brass as well as the softer metals.

## CAMBRIDGE

Philosophical Society, February 9.—Prof. Newton, president, in the chair.—Mr. W. J. Lewis was elected a Fellow of the Society.—The following communications were made to the Society:—A theorem in elementary trigonometry, by Mr. J. W. L. Glaisher. The theorem in question is that—

$$\cos a \cos b \cos c \cos d + \sin a \sin b \sin c \sin d \\ = \cos a' \cos b' \cos c' \cos d' + \sin a' \sin b' \sin c' \sin d',$$

where  $a' = \frac{1}{2}(-a + b + c + d)$ ,  
 $b' = \frac{1}{2}(a - b + c + d)$ , &c.  
 so that  $a' = \sigma - a$ ,  $b' = \sigma - b$ , &c.  
 where  $\sigma = \frac{1}{2}(a + b + c + d)$ .

—Note on the reflection and refraction of light, by Mr. R. T. Glazebrook. In his paper on the reflection and refraction of light at the bounding surface of two isotropic media Green assumes that no external forces act on the ether in either medium, and that its elasticity is the same in the two. He further assumes that the velocity of propagation of the normal vibrations is very great compared with that of the transverse. Kirchhoff, in a paper read before the Berlin Academy, replaces Green's assumptions by the supposition that external forces act over the common surface of the two media of such a nature as to prevent the propagation of the normal waves. In addition he supposes that these forces produce neither loss nor gain of energy, and discusses the case of two crystalline media. These principles are applied in the paper to the problem for two isotropic media, and expressions for the intensity of the reflected and refracted waves are deduced. For the reflected wave the intensity of the wave in which the vibrations are in the plane of incidence agrees with that given by Fresnel for vibration perpendicular to that plane, and *vice versa*. The intensities of the refracted waves are slightly different from Fresnel's expressions. The results agree with those given by MacCullagh, *Irish Transactions*, 1848. His expression for the intensity of the strained medium is, however,

inconsistent with the conservation of energy. The change of phase produced by total reflection is also investigated. It follows, too, from the equations, that the density of the ether is the same in all isotropic transparent bodies.

BOSTON, U.S.A.

American Academy of Arts and Sciences, January 14.—Hon. Charles Francis Adams in the chair.—Mr. S. W. Holman, of the Mass. Institute of Technology, considered the bearing of Chappuis's recent study of surface-condensation upon the determination of the coefficient of expansion of gases, and shows that the effect of introducing a correction for condensation is in general to bring the results obtained by different experimenters into closer accordance.—Mr. W. H. Pickering has investigated the relative amount of light of four different refrangibilities in various artificial lights and in moonlight and sunlight, using as standard a portion of the flame from an argand gas-burner. He also discussed the question of the sun's temperature, showing from the intrinsic brilliancy of the sun and from the relative amount of yellow and violet light in its rays the temperature lies between 270,000° C. and 22,000° C. as probable limits. An additional method, based upon other measurements discussed in a different manner gives 80,000° C. as the probable upper limit and 8,000° as the lowest possible limit.

VIENNA

Imperial Academy of Sciences, January 8.—On perfect inscribed polygons, by Prof. Weyr.—Researches on picrotoxin, by Prof. v. Barth.—Researches on the rainfall of Austria-Hungary (second part), by Herr Hann.—On the number of optic nerve fibres and retinal cones in the human eye, by Prof. von Brücke.—On heliotropic phenomena in the plant-kingdom, by Prof. Wiesner.

January 15.—On the theory of gaseous friction, by Prof. Boltzmann.—On a relation between the singular elements of cubic involutions, by Prof. Le Paige.—On the carrying power of magnets, by Prof. Stefan.—On the principal reducing properties of ferro-oxalate of potassium and some reactions produced by them, by Dr. Eder.—Histological researches on traumatic inflammation of the brain, by Dr. Unger.—Researches on the formation of the ground substance of cartilage, by Dr. Spina.—New method for quantitative determination of ferrous and ferric oxide in presence of organic acids and also cane-sugar, by Dr. Eder and Herr Meyer.

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